IN THE CLAIMS

Claim 1 (Currently Amended): A polarization mode dispersion compensator comprising:

a separator that aligns orthogonal first and second polarization components of a received optical signal with respect to two orthogonal axes of a polarization beam splitter using optical signal information output via a second path of a first path and the second path of the two outputs of the polarization beam splitter, splits the first and second polarization components, and transmits the first polarization component via the first path and the second polarization component via the second path; ~~and~~

a differential time delay remover that receives the first and second polarization components that has been split to remove a differential time delay between the first and second polarization components; and

a first optical tap that receives the second optical signal via the second path;

a photodetector that converts the optical signal diverged by the first optical tap into an electric signal; and

a band-pass filter that filters a particular frequency component of an electrical spectrum of the electric signal.

Claim 2 (Currently Amended): The polarization mode dispersion compensator of claim 1, wherein the separator comprises:

a polarization controller (PC) that transforms principal states of polarization of the optical signal received via an optical transmission fiber;

a first polarization beam splitter that splits the transformed optical signal into orthogonal first and second polarization components, and transmits an optical signal of the first optical signal via the first path and an optical signal of the second optical signal via the second path;

~~a first optical tap that receives the second optical signal via the second path, diverges a portion of the second optical signal, and transmits the remaining portion of the second optical signal;~~

~~a photodetector that converts the optical signal diverged by the first optical tap into an electric signal;~~

~~a band-pass filter that filters a particular frequency component of an electrical spectrum of the electric signal~~; and

a PC controller that controls the PC using a power value of the filtered frequency component so that the first and second polarization components of the received optical signal are aligned with respect to two axes of the first polarization beam splitter, the first polarization component is transmitted via the first path, and the second polarization component is transmitted via the second path;
<u>wherein the first optical tap diverges a portion of the second optical signal, and transmits the remaining portion of the second optical signal</u>.

Claim 3 (Original): The polarization mode dispersion compensator of claim 2, wherein the differential time delay remover comprises:

a variable delay line that receives the optical signal of the first polarization component diverged by the first polarization beam splitter and then variably introduces a time delay to the optical signal of the first polarization component;

a second polarization beam splitter that couples and outputs the optical signal of the first polarization component and the optical signal of the second polarization component transmitted through the first optical tap;

a second optical tap that diverges a portion of the coupled optical signal output from the second polarization beam splitter and transmits the remaining portion of the coupled optical signal; and

a delay line controller that controls the variable delay line so as to remove the differential time delay between the first and second polarization components using the optical signal diverged by the second optical tap.

Claim 4 (Original): The polarization mode dispersion compensator of claim 2, wherein the PC controller comprises:

a power comparing unit that compares a power value of the electric signal output from the band-pass filter with a previously measured power value; and

a feedback control signal applying unit that applies a feedback control signal to the PC so as to select a smaller value based on the comparison result.

Claim 5 (Original): The polarization mode dispersion compensator of claim 3, wherein the PC controller comprises:

a power comparing unit that compares a power value of the electric signal output from the band-pass filter with a previously measured power value; and

a feedback control signal applying unit that applies a feedback control signal to the PC so as to select a smaller value based on the comparison result.

Claim 6 (Original): The polarization mode dispersion compensator of claim 3, wherein the delay line controller comprises:

a photodetector that converts the optical signal diverged by the second optical tap into an electric signal;

a band-pass filter that filters a predetermined electrical spectrum component of the electric signal:

a power comparing unit that compares a power value of the filtered electric signal with a previously measured power value; and

a feedback control signal applying unit that applies a feedback control signal to the variable delay line so as to select a greater value based on the comparison result.

Claim 7 (Original): The polarization mode dispersion compensator of claim 3, wherein the delay line controller comprises:

a degree of polarization measuring unit that measures a degree of polarization of the optical signal diverged by the second optical tap;

a degree of polarization comparing unit that compares the measured degree of polarization with a previously measured degree of polarization; and

a feedback control signal applying unit that applies a feedback control signal to the variable delay line so as to select a greater value based on the comparison result.

Claim 8 (Currently Amended): The polarization mode dispersion compensator of claim 1, wherein the separator comprises:

a circulator that circulates the optical signal received via the optical transmission fiber;

a PC that transforms principle states of polarization and direction of the optical signal output from the circulator;

a polarization beam splitter that splits the transformed optical signal into orthogonal first and second polarization components, and transmits an optical signal of the first polarization component via the first path and an optical signal of the second polarization component via the second path;

a principal states of polarization (PSP) monitoring unit that receives the optical signal via the second path, reflects a portion of the optical signal, and transmits the remaining portion of the optical to calculate a power of the transmitted portion of the optical; and

a PC controller that controls the PC using the calculated power value so that the first and second polarization components are aligned with respect to two orthogonal axes of the polarization beam splitter, the first polarization component is transmitted via the first path, and the second polarization component is transmitted via the second path.

Claim 9 (Currently Amended): The polarization mode dispersion compensator of claim 8, wherein the differential time delay remover comprises:

a variable delay line that receives the optical signal of the first polarization component output from the polarization beam splitter and then variably introduces a time delay to the optical signal of the first polarization component;

a mirror that reflects the optical signal of the first polarization component;

~~an optical tap that diverges the coupled optical signal which is obtained by coupling the optical signal of the first polarization component reflected from the mirror to the optical signal of the second polarization component reflected from the PSP monitoring unit using the polarization beam splitter and transmitting the coupled optical signal through the PC and the circulator;~~ and

a delay line controller that controls the variable delay line using the optical signal diverged by the optical tap to remove a differential time delay between the first and second polarization components,
wherein the first optical tap diverges the coupled optical signal which is obtained by coupling the optical signal of the first polarization component reflected from the mirror to the optical signal of the second polarization component reflected from the PSP monitoring unit using the polarization beam splitter and transmitting the coupled optical signal through the PC and the circulator.

Claim 10 (Currently Amended): The polarization mode dispersion compensator of claim 8, wherein the PSP monitoring unit comprises:

a half mirror that receives the optical signal via the second path, reflects a portion of the received optical signal, and transmits the remaining portion of the received optical signal.~~;~~

~~a photodetector that converts the transmitted optical signal into an electric signal; and~~

~~a band-pass filter that filters a predetermined frequency component of an electrical spectrum of the electric signal.~~

Claim 11 (Currently Amended): The polarization mode dispersion compensator of claim 8, wherein the PSP monitoring unit comprises:

~~an optical tap that receives the optical signal via the second path and diverges the optical signal into first and second optical signals;~~

a mirror that totally reflects ~~the~~ a first optical signal;
wherein the first optical tap diverges the optical signal into first and second optical signals, ~~a~~ the photodetector ~~that~~ converts ~~the~~ a second optical signal into an electric signal~~;~~, ~~and~~ ~~a~~ the band-pass filter that filters a predetermined frequency component of ~~an~~ the electrical spectrum of the electrical signal.

Claim 12 (Currently Amended): The polarization mode dispersion compensator of claim 9, wherein the delay line controller comprises:

~~a photodetector that converts the optical signal diverged by the optical tap into an electric signal;~~

~~a band-pass filter that filters a predetermined electrical spectrum of the electric signal;~~

a power comparing unit that compares a power value of the electrical signal with a previously measured power value; and

a feedback control signal applying unit that applies a feedback control signal to the variable delay line so as to select a greater value based on the comparison result;

wherein the band-pass filter filters a predetermined electrical spectrum of the electric signal.

Claim 13 (Original): The polarization mode dispersion compensator of claim 9, wherein the delay line controller comprises:

a degree of polarization measuring unit that measures a degree of polarization of the optical signal diverged by the optical tap;

a degree of polarization comparing unit that compares the measured degree of polarization with a previously measured degree of polarization; and

a feedback control signal applying unit that applies a feedback control signal to the variable delay line so as to select a greater value based on the comparison result.

Claim 14 (Currently Amended): A method of compensating for polarization mode dispersion, comprising:

aligning orthogonal first and second polarization components of a received optical signal with respect to two orthogonal axes of a polarization beam splitter using optical signal information output via a second path of a first path and the second path of the two outputs of the polarization beam splitter, splitting the first and second polarization components, and transmitting the first polarization component via the first path and the second polarization component via the second path;

receiving a second optical signal via the second path, diverging a portion of the second optical signal, and transmitting the remaining portion of the second optical signal;

converting the diverged optical signal into an electric signal;

filtering a particular frequency component of an electrical spectrum of the electric signal; and

receiving the first and second polarization components that have been split to remove a differential time delay between the first and second polarization components.

Claim 15 (Currently Amended): The method of claim 14, wherein the splitting of the first and second polarization components comprises:

transforming principal states of polarization of the optical signal received via an optical transmission fiber;

splitting the transformed optical signal into orthogonal first and second polarization components, and transmitting an optical signal of the first optical signal via the first path and an optical signal of the second optical signal via the second path;

~~receiving the second optical signal via the second path, diverging a portion of the second optical signal, and transmitting the remaining portion of the second optical signal;~~

~~converting the diverged optical signal into an electric signal;~~

~~filtering a particular frequency component of an electrical spectrum of the electric signal~~; and

aligning the first and second polarization components of the received optical signal with respect to two axes of a polarization beam splitter, using a power value of the filtered frequency component, and transmitting the first polarization component via the first path and the second polarization component via the second path.

Claim 16 (Original): The method of claim 14, wherein the removal of the differential delay time comprises:

receiving the optical signal of the first polarization component diverged by the polarization beam splitter and then variably introducing a time delay to the optical signal of the first polarization component;

coupling and outputting the optical signal of the first polarization component to which the time delay is introduced and the optical signal of the second polarization component transmitted via the second path;

diverging a portion of the coupled optical signal output from the second polarization beam splitter and transmitting the remaining portion of the coupled optical signal; and

removing the differential time delay between the first and second polarization components using the diverged optical signal.

Claim 17 (Original): The method of claim 14, wherein the splitting of the first and second polarization components comprises:

circulating the optical signal received via an optical transmission fiber; transforming principle states of polarization and direction of the circulated optical signal;

splitting the transformed optical signal into orthogonal first and second polarization components and transmitting an optical signal of the first polarization component via the first path and an optical signal of the second polarization component via the second path;

receiving the optical signal via the second path, reflecting a portion of the optical signal, and transmitting the remaining portion of the optical to calculate a power of the transmitted portion of the optical; and

aligning the first and second polarization components with respect to two orthogonal axes of the polarization beam splitter, using the calculated power value, and transmitting the first polarization component via the first path and the second polarization component via the second path.

Claim 18 (Original): The method of claim 14, wherein the removal of the differential delay time comprises:

receiving the optical signal of the first polarization component output from the polarization beam splitter and then variably introducing a time delay to the optical signal of the first polarization component;

reflecting the optical signal of the first polarization component to which the time delay is introduced;

coupling the reflected optical signal of the first polarization component to the optical signal of the second polarization component reflected via the second path, circulating the coupled optical signal, and diverging the coupled optical signal; and

removing a differential time delay between the first and second polarization components using the diverged optical signal.